

ORDER

DEPARTMENT OF TRANSPORTATION FEDERAL AVIATION ADMINISTRATION

6950.23A

5/23/83

SUBJ: CABLE LOOP SYSTEMS AT AIRPORT FACILITIES

1. PURPOSE. This order establishes the program, planning, and implementation guidelines for upgrading power and control/signal systems supporting the National Airspace System (NAS) at major hub airports.

2. DISTRIBUTION. This order is distributed to branch level in the Program Engineering and Maintenance, Systems Engineering, and Air Traffic Services and the Office of Airport Standards and to division level in the Office of Flight Operations in Washington headquarters; to branch level in the regional Airway Facilities, Air Traffic, and Airports divisions; to division level in the FAA Depot at the Mike Monroney Aeronautical Center; to division level in the Test And Evaluation, Aircraft and Airport Systems Technology, and Facilities Divisions at the FAA Technical Center; and to all Airway Facilities sectors, sector field offices, sector field units, and sector field office units.

3. CANCELLATION. Order 6950.23, Policy for Control/Signal Cable Loop at Terminal Facilities, dated 9/25/79, is canceled.

4. BACKGROUND. Order 6950.23 was issued with the expectation that control and signal cable configured in a loop system would be initiated with the establishment of weather system projects, primarily low level wind shear alert system (LLWAS) and VORTEX advisory system (VAS) projects commencing in FY-80. This did not materialize. Additionally, the development of the National Airspace System Plan (NASP) dated December 1981 expanded the cable loop system philosophy to encompass power cables as well as new developments in data transmitting systems, such as fiber optics cables and radio linkages. Consequently, this revision is intended to enable the implementation of NASP items VII-54, Packet Radio and VIII-36, Modernize Airport Cables into Loop System, as applicable.

5. EXPLANATION OF CHANGES.

a. Policy terminology and all reference thereto has been removed.

b. The SCOPE has been added to expand the order to include power cables, fiber optics and packet radio.

6. SCOPE. This order applies wherever major construction or installation projects are being planned which require numerous cables. It further applies to the replacement of deteriorated cables or extensions of functions or systems at existing airports. All intermediate and major activity level airports in the NAS shall, where cost-effective, be provided with a cable system configured in a loop around the airport. The loop system shall provide for both existing and future FAA facilities which includes power, signal, and control cables. Installation of a radio link system, where cost-effective, shall be considered in conjunction with an airport cable loop system.

Distribution:

A-W(PM/ES/AT/AS)-3; A-W(FO)-2;
A-X(AF/AT/AS)-3; A-Y(DE)-2; A-Z(TE/AS/AN)-2; A-FAF-2/3/7
(STD)

Initiated By: APM-530

7. RESPONSIBILITIES.

a. Planning. Each region shall use the airport layout plans for the major hub airports and the guidance provided herein for the planning, design, and implementation of the loop system. Items to be considered for all systems include the facility importance and location, redundancy requirements, methods of installation, costs, and combining of several facilities requirements within the same system. Reliability and maintainability of the system selected will be of prime importance. The system configuration will be determined based upon the aforementioned factors and availability of alternate sources of power. Use of remote maintenance monitoring and control, as well as sources of signal interference such as that caused by thunderstorm activity in the area, shall be included in the determination of the control/signal system selected.

b. Airport Candidates. Each region shall determine which of their airports are candidates for the upgraded cable loop system. Those to be considered include control/signal systems consisting of metallic conductor cables, fiber optic cables, radio control systems, or combination of radio link and cable systems. Based on a benefit/cost analysis, priority should be given to the airports known to be in need of additional cabling or major replacement of cables.

8. SYSTEM DESIGN. The underground cable systems shall form a loop where cost-effective similar to the airfield layouts depicted in appendix 1. These conductors shall be direct-buried in underground ducts, conduits, or combinations thereof. Where it is not effective to run the loop to the facility due to its location, a tap from the loop will be made and a short radial feeder run to the facility. Taps, switches, transformers, etc., shall be installed such that no trenching or excavation is necessary for any maintenance or isolation of sections of the loop. In so far as practicable, all of the above shall be in above-grade housings such as translosures and/or terminal posts. Where above-grade connections are not practicable, manholes and handholes will be used. A loop will provide for redundancy without the need for two feeders to each installation. With proper switching in the loop, sections of the loop could be isolated to remove the section when damaged and returned to service with a minimum of downtime. The master plan will provide, where feasible, for the ultimate installation of a loop system utilizing existing cables, cables planned for new and relocated facilities, and cables to be installed in replacement projects.


a. Power systems. Power systems require metallic conductors rated for the voltage and current loads of the feeder. Present installations consist of a series of radial feeders from the airport traffic control tower (ATCT) to the facilities or from the power company distribution system. Where standby power is essential, an engine generator is installed at that facility. Occasionally, two facilities are fed from a collocated engine generator installation. When the loop is completed, it will allow for the use of one large engine generator in lieu of several smaller ones to furnish standby power when there is a failure of the power company feeder to the ATCT or substation feeding the loop.

b. Control/Signal System. Wired control/signal systems presently consist of metallic conductors run as multiple conductor cables. Redundant cables are often installed in the same trench as the basic feeder and usually when one is cut, the second is also cut. Methods other than the use of metallic conductors should be considered where a new system is planned and it is not practical or cost-effective to utilize existing cabling in the design of the loop. These are:

(1) Fiber Optic Systems. Where a new control/signal cable system is required, fiber optic cables should be considered as they are impervious to lightning induced surges, noise effects from power cables (which allows fiber optics and power cables to be installed in the same trench), and are of a smaller diameter than an equivalent metallic conductor cable. Fiber optic cables allow the use of superimposed signals for various control and signal needs. An example of where to consider fiber optics in the master plan is where remote maintenance and control are to be installed and the present cable system is not adequate and should to be replaced or added to throughout much of its length.

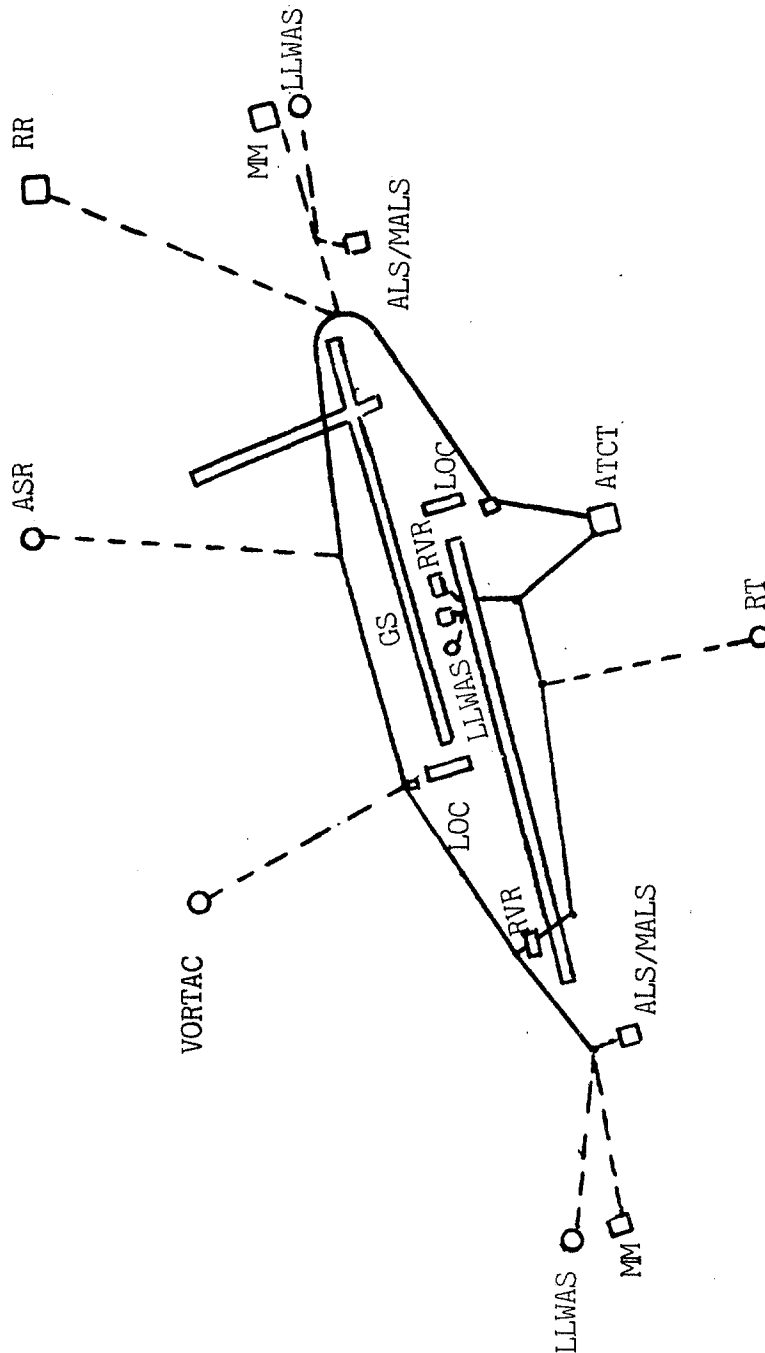
(2) Radio Link. Radio link systems should be considered in lieu of cables where frequencies are available, climatic conditions and cost-benefits are favorable, and where ongoing operations will not interfere with or be interfered by a radio controlled system. A radio link system may be used in combination with a cable system and where the addition of remote maintenance monitoring and control is feasible.

9. FUNDING. Requests for funding shall be made in accordance with established budget procedures as contained in Order 2500.14, Call For Estimates-Facilities and Equipment. Budget estimates for construction projects, radio link systems, and cable replacement projects should reflect cable requirements in accordance with the region's comprehensive plan. Projects to complete loop arrays by filling gaps in existing configurations or to provide additional conductors or capacity for future growth are also eligible for inclusion in the cable program, Modernize Airport Cables into Loop Systems, as defined in the auxiliary systems chapter of the latest edition of the NASP.



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FIGURE 1. CONTROL/SIGNAL CABLE LOOP FOR A TYPICAL AIRFIELD



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FIGURE 2. MULTIPLE CONTROL/SIGNAL CABLE LOOPS (L1 & L2)
FOR A TYPICAL AIRFIELD

